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It is quite essential, however, that their solution be undertaken with a full appreciation of the obstacles which confronted these early voyagers, and some local knowledge of the physical features which they encountered in the western deserts and along the shores of the Great South Sea.

THE COAL RESOURCES OF THE WORLD: A SUMMARY

By LEON DOMINIAN

An investigation of the world's coal resources was undertaken by the XIIth International Geological Congress held in Canada in the summer of 1913 with a view to estimating the tonnage available in known fields. The results of this inquiry have been embodied in a valuable monograph.[1] The importance of the topic suggests interpretation of certain facts from the standpoint of the geographer.

Coal is the most valuable mineral exploited in the world. The product, once taken out of the earth, cannot be replaced. The study of its reserves, therefore, appeals to millions of human beings whose comfort and material fortunes depend directly on the production of this fuel. Its exhaustion in any country would seriously hamper operations in hundreds of factories.

The relation of coal to civilization is apparent from an inspection of any world-map. The heaviest coal producing countries lead in civilization. A large portion of the wealth per capita in each may be traced directly to the hives of industry and the centers of population that cluster around the sites of their coal supplies. The factor of area or of geographical position appears overshadowed by the importance of that of coal resources. Belgium is a case in point. This does not imply, however, that civilization depends on coal entirely. It means that nineteenth or twentieth century civilization alone is based in part on coal consumption. Given the discovery of an economically more advantageous source of energy, and coal will become as unimportant from the standpoint of the world's commerce as trade winds in our day.

The bulk of the world's supply of coal is stored in the continental areas of the northern hemisphere. North America and Eurasia contain approximately six-sevenths of the total reserves. The fuel is distributed most abundantly north of the 20th parallel of north latitude. This is not due so much to the development of large land masses in the northern hemisphere as it is to the existence of vast areas of rocks belonging to the Carboniferous period which are not well represented either in Africa or South America. A factor of far-reaching economic importance in the commercial and industrial relations between northern and southern continents is thereby created. Industrial supremacy of the northern continents is insured as long as coal is not superseded by another fuel or new reserves are not discovered in the southern continents.

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[1] The Coal Resources of the World, Vols. I, II, III, Atlas. Morang & Co., Toronto, 1913.

Considered as a factor in regional development coal has contributed more than any other mineral to modify the aspect of certain sections of the earth's surface during the past 75 years. Areas of industrial activity provided with intricate networks of communication and thickly populated settlements have originated as a result of the presence of the fuel.[2]

As a rule it will be found that one of the strongest currents of emigration from country to city centers around coalfields, the exodus towards cities being much less pronounced in countries where coal is scarce. The quality of coal is often a factor in determining density of settlement. The large human agglomerations found in the coalfields of Great Britain and Germany or of Pennsylvania are regions in which exceedingly high-grade coals are exploited. The demand for lignite at the other end of the scale is not excessive in manufacturing or industry. Lignite basins consequently are not characterized by the presence of large industrial communities. These are conditions which prevail at present. Conversion of lignite into producer-gas is enabling it, however, to acquire increasing importance as a source of power. The development of producer-gas plants will undoubtedly lead to heavier mining of this grade of fuel. Its value as a factor in economic geography will increase correspondingly.

The absence of coal has generally retarded manufacturing progress. The state of California affords an excellent example of a region in which industrial development was delayed despite favorable geographical conditions, until oil and long-distance electric power transmission came into use. It may be asserted that the influence of coal as a factor in human geography will continue to be exerted until the mineral is replaced by a cheaper source of energy.

About 70 per cent. of the estimated tonnage of the world is stored in the western hemisphere. The coalfields of the North American

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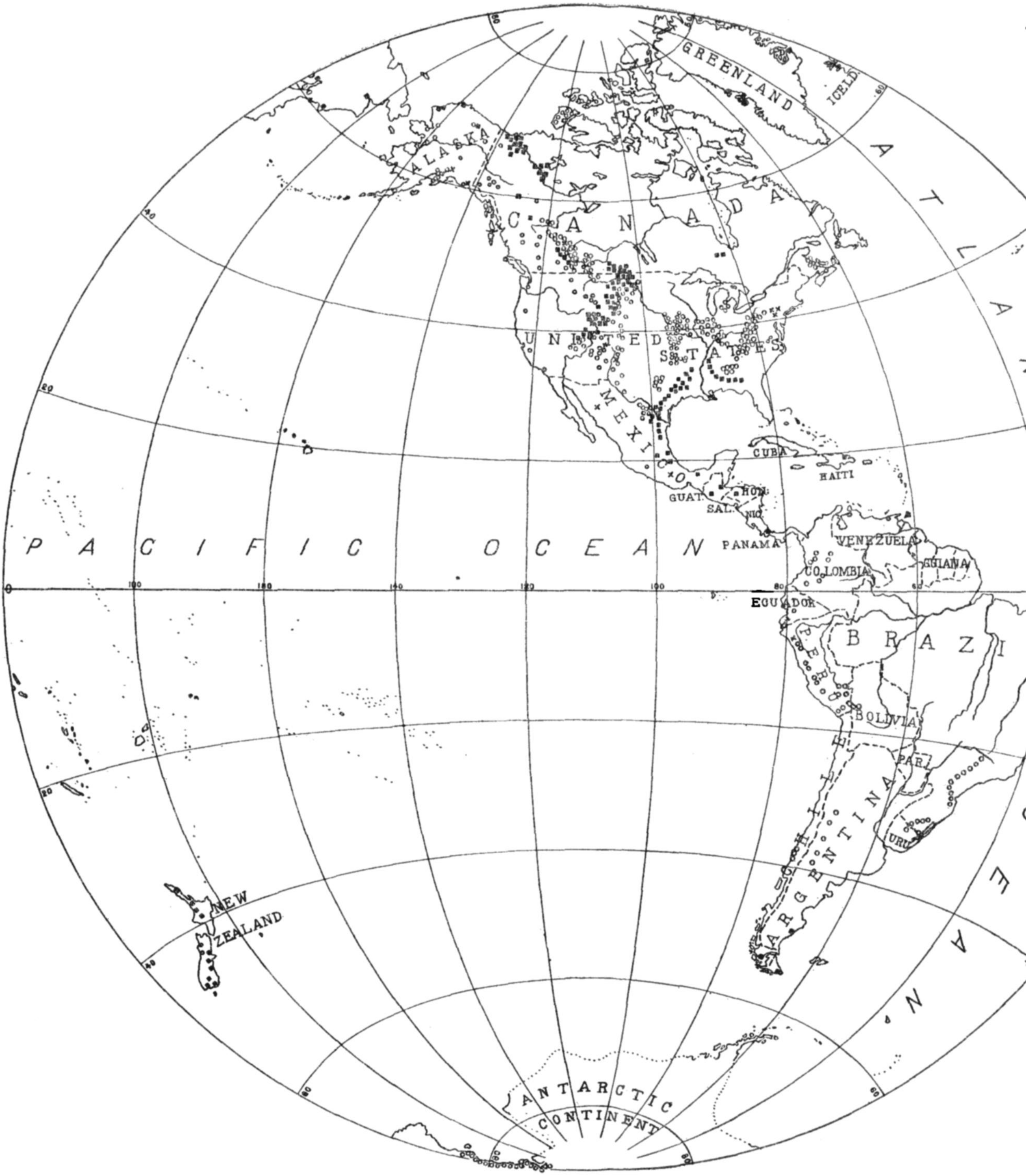
[2] Cf. Brunhes' admirable treatment of the geography of coal in *La Géographie Humaine*, pp. 406-456; and compare the two editions of the MacAlister sheets published by the U. S. Geological Survey, to which reference is made.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BOLIVIA
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CHILE
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PACIFIC OCEAN
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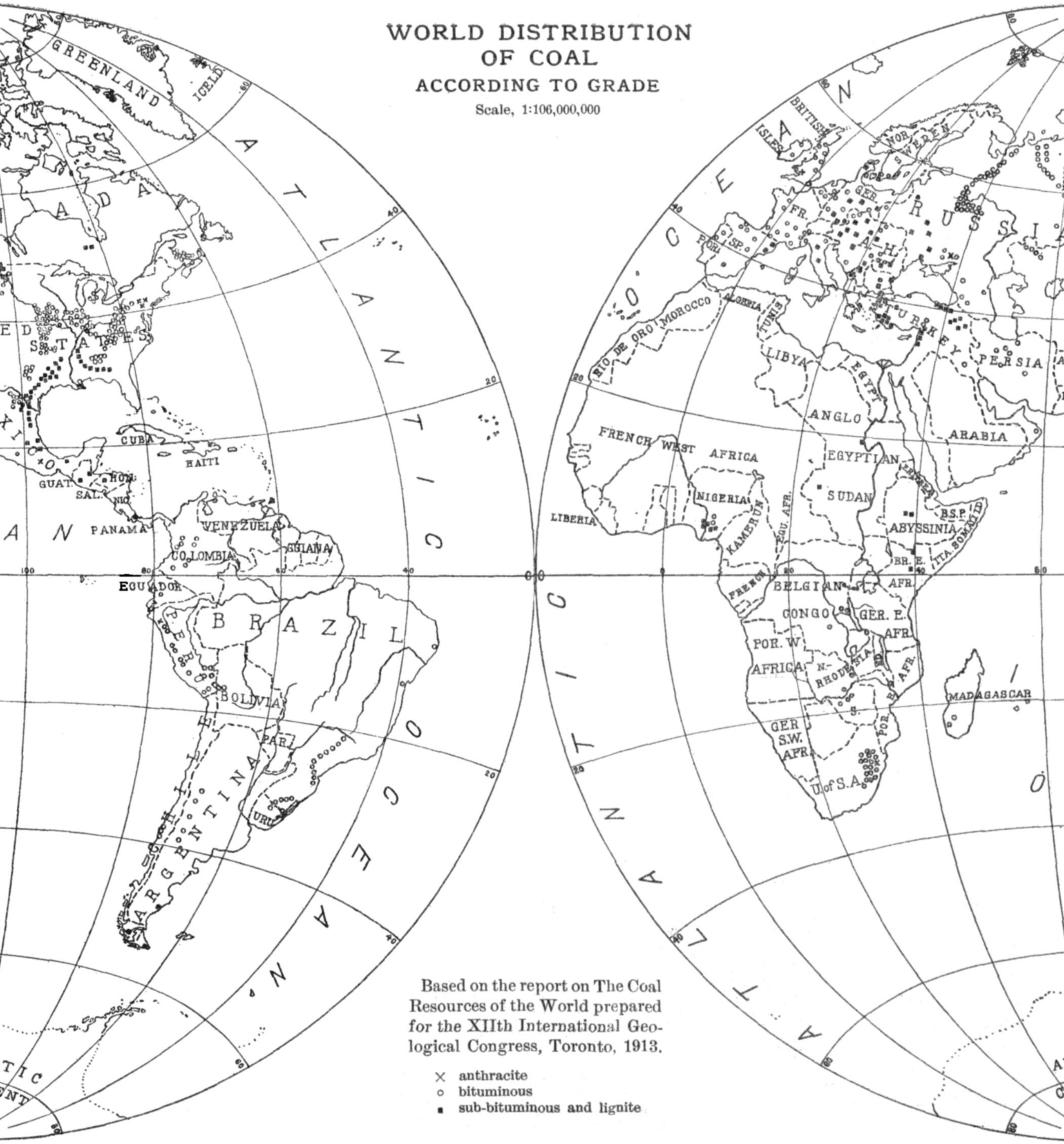


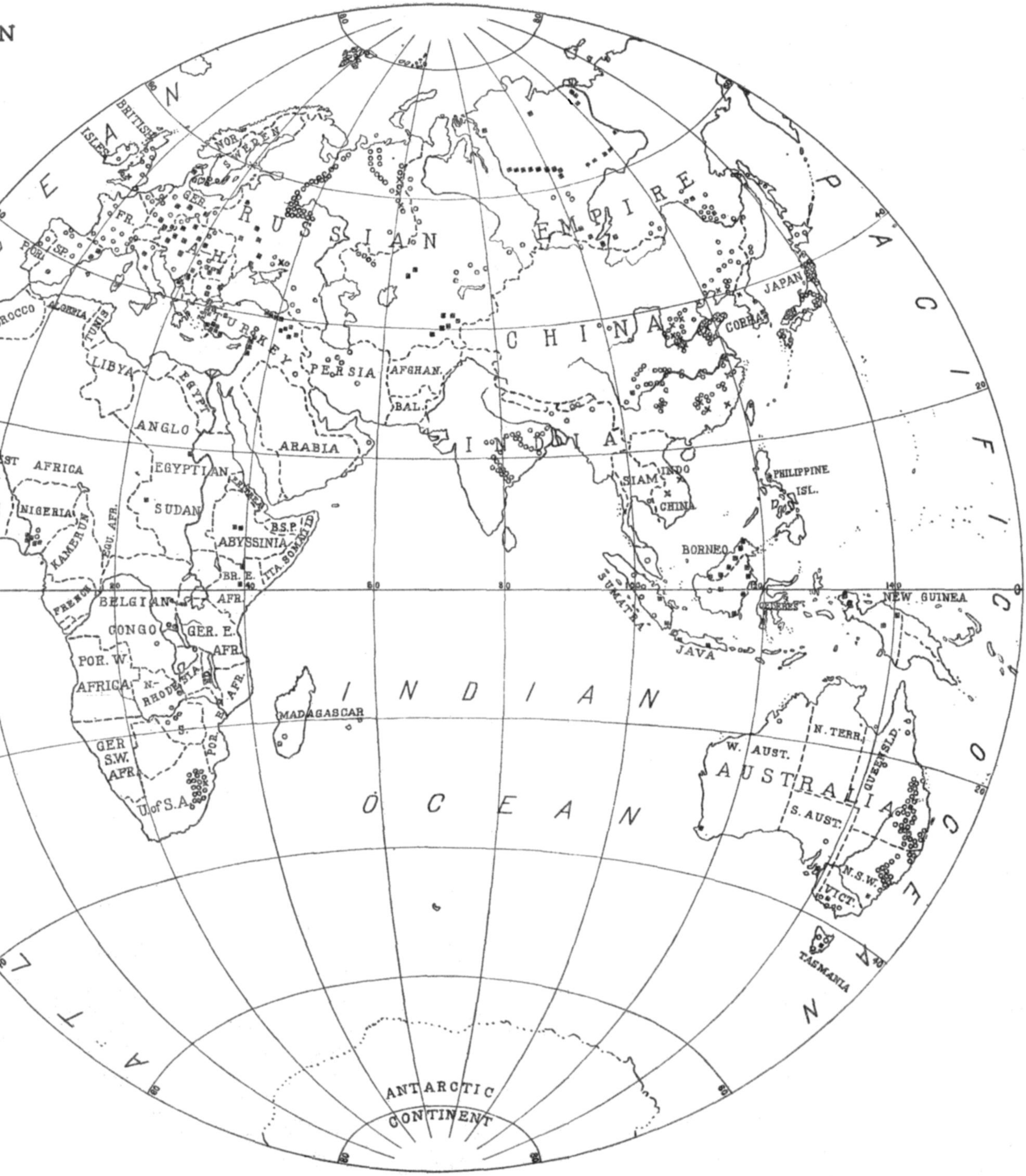
WORLD DISTRIBUTION OF COAL ACCORDING TO GRADE

Scale, 1:106,000,000

Based on the report on The Coal Resources of the World prepared for the XIIth International Geological Congress, Toronto, 1913.

× anthracite
○ bituminous
■ sub-bituminous and lignite

N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C H I N A
JAPAN
COREA
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ANGLO EGYPTIAN SUDAN
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ITA. SOMALI
BR. E. AFR.
ST AFRICA
NIGERIA
KAMERUN
EQU. AFR.
FRENCH
BELGIAN CONGO
GER. E. AFR.
POR. W. AFRICA
N. RHODESIA
S. RHOD.
POR. E. AFR.
GER S.W. AFR.
U. of S.A.
MADAGASCAR
SIAM
INDO CHINA
PHILIPPINE ISL.
BORNEO
SUMATRA
CELEBES
JAVA
NEW GUINEA
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P A C I F I C   O C E A N
A T L
N. TERR.
W. AUST.
QUEENSLD.
A U S T R A L I A
S. AUST.
N.S.W.
VICT.
TASMANIA
ANTARCTIC CONTINENT
20
40
60
80
100
120
140
0
20
40
60
80

continent are situated between the Rockies and the Appalachian highlands. Two-thirds of the world's total supply is contained within this area in the shape of every possible grade of the fuel. The highest grades have been discovered so far along the eastern front of the Appalachian region and in the Arkansas fields. Both of these areas lie in the vicinity of centers of heavy geological disturbances and mountain building. In the west, the Pacific region cannot compare for abundance of coal with the Rocky Mountains or northern Great Plains areas. Nevertheless, the westernmost states carry supplies which are by no means inconsiderable. South American countries are not self-dependent for their coal supply. They offer markets of consumption which deserve investigation on the part of northern producers. It is well to bear in mind, however, that South America is not so thoroughly prospected as the North American continent.

Eurasian coal is distributed principally in the vicinity of the seas which surround this land mass. The bituminous fields of northern Russia spread southward from the Arctic Ocean. The abundant reserves of the Belgian-German basins are cut off from the British fields by the waters of the North Sea just as the Japanese beds are separated from the fields of northern China by the Sea of Japan. Proximity of coal beds to the sea is observable in the Mediterranean basin. The two important coalfields of the Indian peninsula almost reach the shores of the Indian Ocean. Coal measures in China are likewise distributed from the Pacific Ocean inland. The province of Shantung is well favored in this respect and enormous bodies of anthracite are known in the broad plains of Honan, and Szechwan. Nevertheless, although central Eurasia contains relatively small quantities of coal, almost every one of its sovereign states has been provided with commercial quantities of the fuel. Taken according to grouping, the coalfields may be divided into the two major districts of Atlantic and Pacific fields. To the west over one-tenth of the world's reserve lies beneath the subsoil of Europe, while approximately twice this quantity is known to exist in the Pacific or eastern field. Requirements of European civilization have brought about an enormous production in the Atlantic Eurasian field, the reserves of which are therefore being rapidly depleted.

The following estimates are reproduced from the monograph published by the Congress. Discoveries of new fields in the past two years, such as the lignite beds of the Bonnifield region about 50 miles south of Fairbanks, Alaska, give appreciable increase to the totals set forth below.

TABLE I—ESTIMATED COAL RESERVE OF NORTH AMERICA
In Million Tons

Country	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
Canada	2,158	283,661	948,450	1,234,269
Newfoundland		500		500
United States	19,684	1,955,521	1,863,452	3,838,657
Central American Countries		1	4	5
Totals	21,842	2,239,683	2,811,906	5,073,431

TABLE II—ESTIMATED COAL RESERVE OF SOUTH AMERICA
In Million Tons

Country	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
Venezuela		5		5
Colombia		27,000		27,000
Peru	700	1,339		2,039
Argentine		5		5
Chile		3,048		3,048
Totals	700	31,397		32,097

TABLE III—ESTIMATED COAL RESERVE OF EUROPE
In Million Tons

Locality	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
Spitzbergen Islands		8,750		8,750
Faröe Islands			50	50
Sweden		114		114
Russia	37,599	20,849	1,658	60,106
Great Britain and Ireland	11,357	178,178		189,535
France	3,271	12,680	1,632	17,583
Holland	320	4,082		4,402
Belgium		11,000		11,000
Germany		409,975	13,381	423,356
Hungary		113	1,604	1,717
Austria		40,982	16,570	57,552
Italy	144		99	243
Rumania			39	39
Servia		45	484	529
Bulgaria		30	358	388
Greece			40	40
Portugal	20			20
Spain	1,635	6,366	767	8,768
Totals	54,346	693,164	36,682	784,192

TABLE IV—Estimated Coal Reserves of Africa

In Million Tons

Country	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
Nigeria			80	80
Belgian Congo		90	900	990
Rhodesia	2	493	74	569
Union of South Africa	11,660	44,540		56,200
Totals	11,662	45,123	1,054	57,839

TABLE V—Estimated Coal Reserve of Asia

In Million Tons

Country	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
Asiatic Russia	1	66,034	107,844	173,879
Manchuria	68	1,140		1,208
Japan	62	7,130	778	7,970
China	387,464	608,549	600	996,613
Corea	40	14	27	81
Indo-China	20,002			20,002
British North Borneo			75	75
Dutch Indies		93	1,228	1,321
Philippine Islands			66	66
India		76,399	2,602	79,001
Persia		1,858		1,858
Totals	407,637	761,217	113,220	1,282,074

TABLE VI—Estimated Coal Reserve of Oceania

In Million Tons

Locality	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
New South Wales		118,439		118,439
Victoria		52	31,114	31,166
Queensland	659	13,693	866	15,218
West Australia			653	653
Tasmania		66		66
New Zealand		911	2,475	3,386
Totals	659	133,161	35,108	168,928

TABLE VII—ESTIMATED COAL RESERVES OF THE WORLD
In Million Tons

Continent	Anthracitic Coals	Bituminous Coals	Sub-bituminous and Lignitic Coals	Totals
America (North and South).	22,542	2,271,080	2,811,906	5,105,528
Asia......................	407,637	761,217	113,220	1,282,074
Europe....................	54,346	693,164	36,682	784,192
Oceania...................	659	133,161	35,108	168,928
Africa....................	11,662	45,123	1,054	57,839
Totals................	496,846	3,903,745	2,997,970	7,398,561

The totals obtained in these estimates show that on the basis of the present annual consumption of about 1,300 million tons of coal the world's supply is amply provided for centuries. They also point to the possible shifting of Europe's intensely developed economic fields to American and Asiatic regions. China's abundant resources of the fuel will be undoubtedly reflected in the creation of important centers of industrial activity in the vicinity of the country's coalfields.

STEFANSSON FINDS NEW LAND

No accident has befallen Stefansson and he has been pushing his work with great energy and with admirable results. The widely accepted opinion that he had met, in the north, a westerly drift of the ice that had probably carried him into Arctic waters north of Asia was not correct. On the contrary, he met in the north a prevailing easterly drift that helped him, to some extent, to reach the western coast of Banks Island, which he had distinctly announced, he intended, if possible, to attain. His full report was published in *The New York Times* of September 18; and the news it brought of his safety and of his strenuous and fruitful toil was most gladly welcomed by geographers and the public generally.

The Bulletin announced (Vol. 46, 1914, p. 773) that the explorer had started on his ice trip from Martin Point, Alaska (about 143° W.), on March 22, 1914. Some details were given of the journey north up to April 16, when Stefansson sent the last of his supporting party back. He was left with two men, Andreasen and Storkensen, a dog team, a sledge convertible into a boat, food for men and dogs for 40 days and 360 cartridges for two rifles. His later adventures are here condensed from his report to *The Times.*